6.0 The Role of the Regulator in the Safety Equation

Mr. Jim Done, Deputy Chief Surveyor
The United Kingdom Civil Aviation Authority
Gatwick, England

Introduction

For some time it has been recognised that errors introduced during maintenance continue to contribute at an increasing rate to the number of fatal accidents and incidents happening in all forms of aviation including those occurring in public transport operations.

There have been a number of significant headline grabbing accidents that upon investigation have identified as a common denominator, human error. Errors that could and should have been avoided were introduced possibly because those involved had not been properly trained or that the environment in which the maintenance was being performed was inappropriate for the task in hand. Maybe the absence of the correct tooling and equipment, poor working practices or a lack of technical information contributed to the problem.

There are probably other causes but whatever the reason and whatever the contributing factors, we in aviation, industry and regulators alike, cannot allow the situation to continue unchecked. We must collectively strive to improve the maintenance environment in a manner that reduces the human induced maintenance error level down as low as we can get it.

So what should a maintenance organisation do to address human factors problems or to try to prevent incidents or accidents attributable to human or other factors? "Bolt-on" solutions do not necessarily work; organisations can't simply just provide human factors training for the workforce and consider the problem solved. They need to ensure that all aspects of the organisation are geared towards safety, whether from the human factors perspective, technical perspective or whatever.

The UK CAA believes that one way they could achieve this would be to identify the "essential components" that help shape an organisation and embed within them human factor principles thereby helping to create a climate and environment conducive to safe maintenance. Example "essential components" include;

Safety Culture

An organisations most senior managers should make clear what their beliefs, values and priorities are in respect of safety relative to regulatory, commercial, operational, environmental and working practice pressure. Their "how we do business" message has to put safety first and foremost. The organisation should encourage a style of communication that transmits its safety objectives, their importance to the business and how employees can contribute to achieving them. A safe and just culture should be established that actively encourages all concerned to make safety their number one priority by having a free and open reporting and investigative system designed to identify the causal factors of an incident, rather than one that seeks to identify someone to discipline. Managers responsible for safety should be named and their accountabilities clearly defined and published for all to see.

Physical Environment

An organisation should actively seek to motivate their staff to perform well by creating an environment in which their individual and personal needs are recognised. They should also provide facilities in which noise, heating and lighting are at levels that ensure that the maintenance being carried out is to the highest standard achievable. There should be areas in which technical information can be studied and documentation completed, areas in which "off aircraft" maintenance tasks can be accomplished as well as areas for rest and relaxation.

Training and Competence

An organisation should ensure that its workforce is not only sufficient in terms of numbers, but is competent and adequately trained to carry out the tasks they are engaged in. The training, technical and non technical, must be relevant and to a standard that enhances an individuals understanding of their role particularly in safety significant areas. Continuation training should be carried out at intervals that ensures an individuals knowledge remains current as well as keeping them abreast of organisational changes, events, occurrences and incidents that they can learn from.

Procedures and Practices

An organisation must have user friendly procedures that clearly and unambiguously describe the best practice as to how a particular task is to be accomplished. To be user friendly it usually follows that the "user" must be involved in developing the procedures to which he or she will be expected to work. The procedures and any associated documentation must be readily available at all times and at all locations were the tasks they cover are performed. Work processes must ensure that when followed, the procedures produce a "fit for use" safe product.

Organisations should also be aware that the unwritten way that people behave in carrying out their job does lead to unsafe practices. It is essential therefore that local management and supervisors accept responsibility for ensuring safe practices are applied with poor ones not condoned for the sake of production expediency.

Information Management and Analysis

Within an organisation it should be possible to identify who is responsible for the receipt, timely analysis (review) and distribution of technical, statuary and safety related information such that only current and accurate information is used particularly by those performing maintenance safety related tasks.
Finally, I will describe some of the current and expected challenges that we, as a global industry, face over the next five plus years. I will offer some insight on our regulatory as well as research approaches to address these challenges.

The information for review and analysis could be in a variety of forms including statuary documents, technical publications including maintenance and overhaul manuals, service bulletins, airworthiness directives, internal and external accident and incident reports as well as maintenance error reports.

Hazard Identification and Risk Management

An organisation should be able to monitor and thereby measure its safety performance in a way that would highlight any deterioration in performance at an individual, operational or corporate level. It should also be capable of recognising and reacting to areas of non compliance with statutory requirements and its own policies.

A way of achieving this would be for the organisation to have as a feature of its management structure, a "safety management system" that uses plain language to describe and focus on the hazards and risks associated with its business, particularly those concerned with operational safety.

It would include arrangements for monitoring it's own organisations performance as well as that of any sub contractors employed by carrying out audits and safety related internal incident investigations. The system would make provision for promulgating any investigation findings such that lessons are learned and acted upon. It would allow individuals to raise safety related concerns as well as covering not only an organisations current position, but any changes within the organisation, its practices or processes.

Whatever "system" is adopted it must include a feedback loop that ensures that the information it receives is reviewed, analysed and applied in a way that adds value to safety.

Quality System

The organisation should have as part of its management structure a Quality System that not only establishes compliance with statutory requirements and regulation, but one that ensures a safe operation and consistent product by monitoring maintenance, inspection and airworthiness standards. It should embrace any activities that the organisation sub contracts to a third party. It must include an audit function with the ability to feed back to management findings of non compliance including the identification of risks that may not have objective evidence of non compliance, such that appropriate corrective actions are taken, particularly with regard to safety related matters.

CAA's Position

The UK CAA recognises the need not only to ensure that industry complies with existing regulations, but to encourage industry to adopt the "essential components" discussed above in order to enhance safety. To do this we have launched a number initiatives, the intention being to work with industry and contribute to their effort in respect to HF.

We have for example formed a Human Factors in Maintenance Team within the Aircraft Maintenance Standards Department (AMSD) who are co-ordinating their effort with regards to HF. An early initiative the Team successfully completed in 1999 was the development and delivery of a three day residential training course entitled "Human Factors and Error Management". The course using in house resources, was delivered to 78 Surveyors, 11 Senior Managers and 7 from other groups including the Air Accident Investigation Branch.

As well as lecturing on HF at the CAA's internationally recognised Airworthiness Course the AMSD Team have contributed to an HF training course delivered by another Division within SRG. Additionally commencing about June 2000 we intend to provide further courses to industry targeting potential trainers, i.e. a "training the trainers" exercise.

We have contributed to the development of a question bank and publication on Human Factors in Maintenance relevant to JAR 66, the JAA Certifying Engineer Licensing Code.

In March 2000 the CAA will publish Airworthiness Notice (AN) 71 which provides guidelines for internal and external use on the CAA's policy in respect of maintenance organisations who adopt a formal Maintenance Error Management System (MEMS). We are also developing MEMS related software that will be made available free of charge to those maintenance organisations wishing to use it in addition to a Handbook that covers general human factor principles.

It is our intention through a series of CAA funded Workshops commencing in June 2000, to deliver the software package, provide training on its use as well as discussing the application of AN 71 with industry.

Running parallel to our human factors initiatives has been one intended to actively encourage the adoption of a formal Safety Management System (SMS) by those segments of industry the Safety Regulation Group regulates. An SMS is intended to assist organisations, maintainers and AOC holders alike, to identify safety related risks such that they can be better managed.

The adoption of an SMS enables an organisation to learn lessons from past management failures, avoids "buck passing", gets things done, enables resources to be better allocated as well as providing an ability to audit safety related risks. There are also business benefits including an opportunity to reduce insurance charges, avoid expensive litigation, reduce investigations and avoid over engineering.

Conclusion

Whilst recognising that we must and should continue with human factor related activities we should not lose sight of the broader issues associated with safe maintenance. We can take human factors in maintenance forward by ensuring HF principles are embedded in the various components of an organisation, some of which are described above, in a manner that ensures that it delivers safe maintenance.

By coupling this to the concept of encouraging maintenance organisations to adopt a formalised Safety Management System approach to business it is possible that an environment in which maintenance induced errors are less likely to happen can be created.

In the authors view the adoption of SMS is the next logical step forward if we are serious about developing further improvements to maintenance related safety.